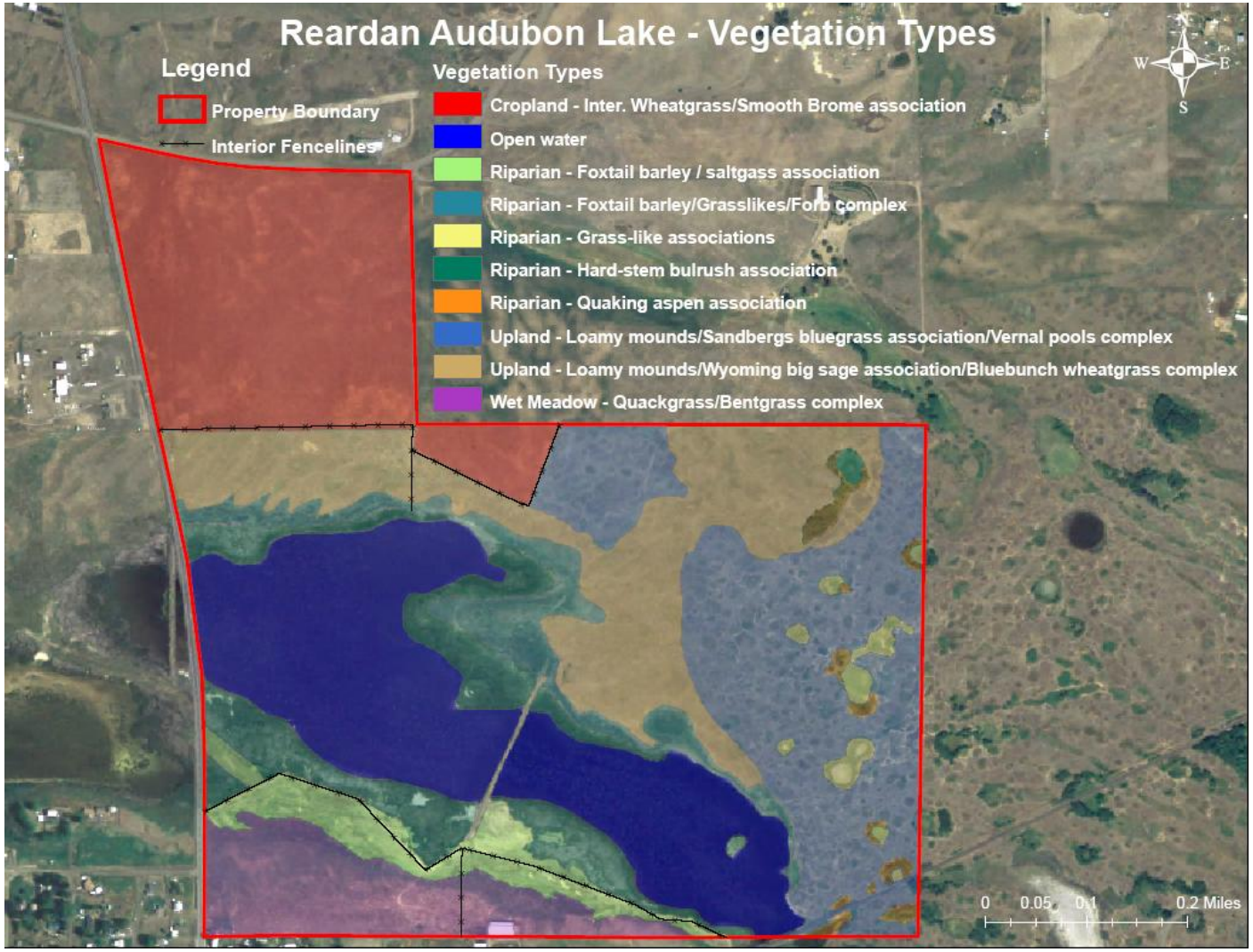
Methods

Vegetation data was collected at 24 sites across the Reardan Audubon Lake parcel in the spring and summer of 2006. Sites were selected using a stratified-random sampling approach to ensure that each of the following vegetation types were sampled: 1) riparian, 2) upland, 3) vernal pools, and 4) wet meadow. Data was collected using 5-m by 10-m macro-plots wherein percent canopy cover was estimated by plant species and vegetation category.

Data analysis will be completed in winter of 2006 using PC-ORD. In the meantime, rough descriptions of plant associations have been completed. These descriptions include the location, percent canopy cover of dominant plant species, and commonly occurring plant species. More information on each plant association will be provided after data analysis is completed.

Ten plant associations were sampled within the 4 major vegetation types: 1) *Foxtail barley / Saltgrass association 2) Grass-likes association,* 3) *Introduced forbs association, 4) Quackgrass association, 5) Colonial bentgrass association, 6) Common spikerush / Navarretia association, 7) Great basin wildrye / Annual forbs association, 8) Wyoming big sagebrush / Perennial grass association, 9) Bluebunch wheatgrass / Sandberg's bluegrass association, and 10) Sandberg's bluegrass / Stiff sagebrush association*. Three additional plant associations were characterized (*Hard-stem bulrush association, Introduced pasture grasses association,* and *Quaking aspen association*), but not sampled due to time constraints.

Figure 1. Map of Reardan's Audubon Lake showing vegetation types, interior fences, and railroad tracks.



Vegetation Types

Riparian

1) *Hard-stem bulrush association* – This plant association occurs along the margin of Reardan Lake and is characterized by the dominance of hard-stem bulrush (*Schoenoplectus acutus*). Other sub-dominate plants species include common spikerush (*Eleocharis palustris*), Canada thistle (*Cirsium arvense*), and three-square bulrush (*Schoenoplectus pungens*).

2) *Foxtail barley / Saltgrass association* – This plant association occurs between the hard-stem bulrush association and the wet meadow associations on the south side of Reardan Lake. This association is dominated by foxtail barley (*Hordeum jubatum*) and saltgrass (*Distichilis spicata*) with occasional patches of common spikerush, fowl mannagrass (*Glyceria striata*), colonial bentgrass (*Agrostis capillaris*), and silverweed (*Argentina anserina*).

Figure 2. Photo of *Foxtail barley / Saltgrass association*

3) *Grass-likes association* – This plant association occurs along the Northern side of Reardan Lake, occasionally adjacent to the lake, but usually separated by a thick band of hard-stem bulrush. This association is typically dominated by clustered field sedge (*Carex praegracilis*), Baltic rush, and large patches of false quackgrass (*Elymus* x *pseudorepens*). The weedy forbs Canada thistle and shield peppergrass (*Lepidium perfoliatum*) also occur frequently in this association.

Figure 3. Photo of *Grass-likes association*

4) *Introduced forbs association* – This association is dominated by Canada thistle with an understory of common spikerush. Fuller's teasel (*Dipsacus fullonum*) and yellow sweetclover (*Melilotus officinale*) also occur frequently in this association.

Figure 4. Photo of *Introduced forbs association*.

5) *Quaking aspen association* – This association is occurs in scattered patches throughout the eastern portion of the parcel. The overstory is dominated by quaking aspen (*Populus tremuloides*). Wild rose (*Rosa woodsii*), common snowberry (*Symphoricarpos albus*), and red-osier dogwood (*Cornus sericea*) are common understory shrubs. The herbaceaous vegetation layer includes Kentucky bluegrass (*Poa pratensis*), Virginia strawberry (*Fragaria virginiana*), and other native forbs.

Wet Meadow

1) *Quackgrass association* - This association occurs in the southwest corner of the Reardan Audubon Lake parcel immediately adjacent to the *foxtail barley / saltgrass association*. Quackgrass (*Elymus repens*) is the dominant plant species in this area. Tall fescue (*Schenodorus phoenix*), clustered field sedge, tall tumblemustard (*Sisymbrium altissimum*), strawberry clover (*Trifolium fragiferum*), and reed canarygrass (*Phalaris arundinaceum*) also occur frequently.

Figure 5. Photo of *Quackgrass association.* This area had been recently grazed by approximately 20 cow-calf pairs.

2) Colonial bentgrass association – This association occurs just north of the barn and adjacent to the *foxtail barley / saltgrass association*. Colonial bentgrass is the dominant plant species. Spike rush and foxtail barley also account for large amounts of canopy cover.

Figure 6. Photo of *Colonial bentgrass association*

Vernal Pools

1) *Common spikerush / Navarretia association* - Plant species dominance among vernal pools in this association tend to differ greatly according to pool depth. Common species occurring in most vernal pools include common spikerush, needle-leaf navarretia (*Navarretia intertexta*), Scouler's pocornflower (*Plagiobothrys scouleri*) and mousetail (*Myosurus* sp.).

Uplands

1) *Great Basin wildrye / Annual forbs association* – This association occurs on loamy mounds throughout the uplands. A diversity of both native and exotic forbs are present on all mounds. Great basin wildrye (*Leymus cinereus*) is typically the dominant grass but did not occur on every mound. Great basin wildrye is occasionally replaced by Idaho fescue (*Fesctuca idahoensis*) as the dominant species. Common exotic forbs include tall tumblemustard, whitetop (*Cardaria draba*), and prickly lettuce (*Lactuca serriola*). Common native forbs include lupine (*Lupinus* sp.), western meadow aster (*Symphoritrichum campestre*), and chaparral willowherb (*Epilobium brachycarpum*).

Figure 7. Photo of *Great Basin wildrye / Annual forbs association*

2) *Wyoming big sagebrush / Perennial grass association* – This association occurs in the northeastern corner of the parcel and is characterized by approximately 20% cover of Wyoming big sagebrush, and 25 % cover of perennial grasses, which includes Sandberg's bluegrass (*Poa secunda*), bluebunch wheatgrass (*Pseudoroegneria spicata*), and Idaho fescue. Common forbs in this association include lupine, tall tumblemustard, and chaparral willowherb. A problem weed in this association is ventenata (*Ventenata dubia*), which occurred on every site, but typically in small amounts.

Figure 8. Photo of *Wyoming sagebrush / bluebunch wheatgrass association*

3) *Bluebunch wheatgrass / Sandberg's bluegrass association* – This association occurs throughout the uplands between loamy mounds. It is characterized by approximately 30% cover of bluebunch wheatgrass and 15-20% cover of other perennial grasses including Sandberg's bluegrass, Idaho fescue, and bulbous bluegrass (*Poa bulbosa*). Common forbs in this association include lupine, tall tumblemustard, and hairy plaintain (*Plantago patagonica*).

Figure 9. Photo of *Bluebunch wheatgrass / Sandberg's bluegrass association*

4) *Sandberg's bluegrass scablands* – This association occurs throughout the uplands but primarily in the eastern portion of the parcel. Sandberg's bluegrass is the dominant plant species on this site. Sub-dominant plant species include stiff sage (*Artemisia rigida*), cheatgrass (*Bromus tectorum*), spring verna (*Draba verna*), stonecrop (*Sedum* sp.), and biscuitroots (*Lomatium* spp.). Ventenata was a dominant weed species on many scablands.

Figure 10. Photo of *Sandberg's bluegrass association*

5) *Introduced pasture grasses association* – This association occurs in the fenced, northwest corner of the parcel and the fenced, north-central portion of the parcel. This association is co-dominated by several introduced pasture grasses, including intermediate wheatgrass (*Thinopyron intermedium*), smooth brome (*Bromus inermis*), crested wheatgrass (*Agropyron cristatum*), and quackgrass. A number of noxious weeds occur in this association such as dalmation toadflax (*Linaria dalmatica*), white-top and field bindweed (*Convulvulus arvensis*).

Recommendations

Weed Control

There are many weed species present on the Reardan Audubon Lake parcel, including State-listed noxious species and weedy annual species. Priority should be given to the control of perennial noxious weed species such as Canada thistle, bull thistle, spotted knapweed, diffuse knapweed, white-top, rush skeletonweed, perennial sowthistle, St. John's wort, field bindweed, and dalmation toadflax.

Canada thistle and perennial sow thistle occur primarily in riparian areas along the lake, whereas bull thistle, dalmation toad-flax and white-top are widespread throughout the uplands. Spotted knapweed, diffuse knapweed, and rush skeleton weed populations are mostly limited to disturbed areas along the access road. St. John's wort has a limited distribution in upland areas, while field bindweed occurs only in the introduced grass pastures.

Mike Finch and Julie Anderson of the Swanson Lakes Wildlife area have expertise in the control of many these weeds and should be consulted along with other local weed control experts.

The most prevalent annual weeds at Reardan Audubon Lake are tall tumblemustard and ventenata. Unfortunately, due to the relatively new introduction of ventenata in the western U.S., there are no known control methods. However, it has been noted that livestock grazing is not a feasible control method due to the unpalatability of this annual grass (Nelson, 2004). Tall tumblemustard is less of a concern than the noxious weeds as it does not readily invade undisturbed areas.

Figure 11. Photo of ventenata infestation in northeast corner of the Reardan Audubon Lake parcel.

Upland Restoration

The northwest portion of the Reardan Audubon Lake parcel has been planted to introduced pasture grasses, primarily smooth brome and intermediate wheatgrass. This area has a high potential for native plant restoration due to accessibility, loamy soils, and flat topography.

According to USDA-NRCS ecological site descriptions, the loamy soils at this site would support a *bluebunch wheatgrass / Idaho fescue association* with scattered Wyoming big sagebrush cover. Other suitable plant species include Sandberg's bluegrass, Thurber's needlegrass (*Achnatherum thurberianum*), prairie junegrass

(*Koeleria macrantha*) hoary puccoon (*Lithospermum ruderale*), fleabane daisy (*Erigeron* spp.), longleaf phlox (*Phlox longifolia*), and other native forbs.

Livestock Grazing

Livestock grazing could be continued on the northwestern and southern sides of Reardan Lake without consequence until native plant restoration occurs. After restoration these areas should be rested for at least 2 to 3 years if livestock grazing is to continue.

Citations

Crawford, R.C. 2003. Riparian vegetation classification of the Columbia Basin, Washington. Natural Heritage Report 2003-03. 118 pages.

Daubenmire, R.F. 1970. Steppe vegetation of Washington. Washington Agricultural Experiment Station Technical Bulletin 62. 131 pages.

Nelson, B. 2004. Ventenata. <http://www.cnr.uidaho.edu/range454/2004%20pet%20weeds/ventenata.html> Accessed 8/20/2006.